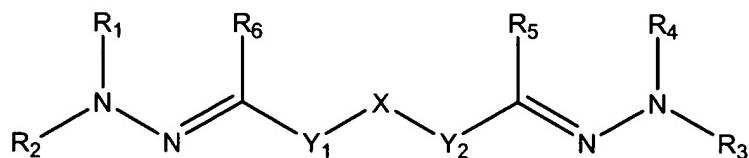


CLAIMS

What is claimed is:

1. An organophotoreceptor comprising an electrically conductive substrate and a photoconductive element on the electrically conductive substrate, the photoconductive element comprising:

5 a) a charge transport material having the following formula:



where X is a linking group;

Y₁ and Y₂ are, each independently, a phenothiazine group, a phenoxazine group, or a

10 phenazine group;

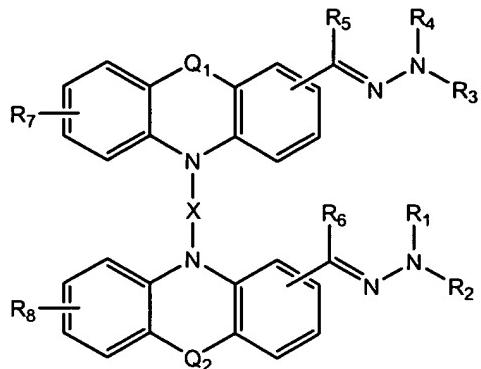
R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

R₅ and R₆ are, each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

15 (b) a charge generating compound.

2. An organophotoreceptor according to claim 1 wherein X comprises a -(CH₂)_m- group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a, R_b, R_c, R_d, R_e, and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.

20 3. An organophotoreceptor according to claim 1 wherein the charge transport material having the following formula:



where Q_1 and Q_2 are, independently, S, O, or NR_9 where R_9 is a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

5 R_1 , R_2 , R_3 , and R_4 are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

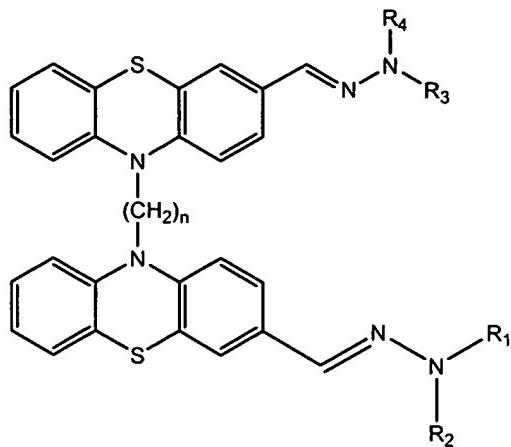
R_5 and R_6 , each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

10 R_7 and R_8 are, each independently, a hydrogen, a nitro group, a cyano group, a halogen, an alkoxy group, a hydroxyl group, a thiol group, an amino group, a carboxyl group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

 X is a linking group.

4. An organophotoreceptor according to claim 3 wherein X comprises a $-(CH_2)_m-$ group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a , R_b , R_c , R_d , R_e , and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.

5. An organophotoreceptor according to claim 3 wherein the charge transport material
20 comprises the following formula:



where n is an integer between 1 and 30 and R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.

6. An organophotoreceptor according to claim 1 wherein the photoconductive element
5 further comprises a second charge transport material.

7. An organophotoreceptor according to claim 5 wherein the second charge transport material comprises an electron transport compound.

8. An organophotoreceptor according to claim 1 wherein said organophotoreceptor is in the
10 form of a drum or a belt.

9. An organophotoreceptor according to claim 1 comprising:

(a) a charge transport layer comprising said charge transport material and a polymeric binder; and

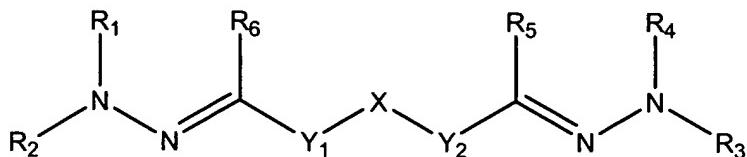
15 (b) a charge generating layer comprising said charge generating compound and a polymeric binder.

10. An electrophotographic imaging apparatus comprising:

(a) a light imaging component; and

20 (b) an organophotoreceptor oriented to receive light from the light imaging component, the organophotoreceptor comprising an electrically conductive substrate and a photoconductive element on the electrically conductive substrate, the photoconductive element comprising:

(i) a charge transport material having the formula



where X is a linking group;

5 Y₁ and Y₂ are, each independently, a phenothiazine group, a phenoxazine group, or a phenazine group;

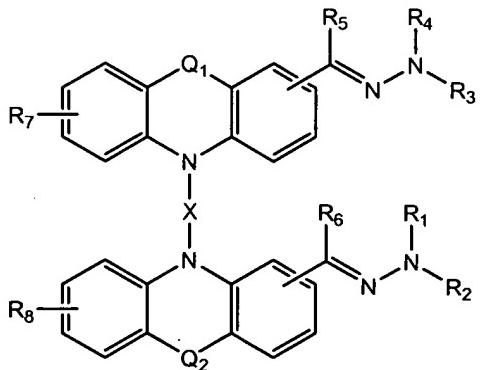
 R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

10 R₅ and R₆ are, each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

(ii) a charge generating compound.

11. An electrophotographic imaging apparatus according to claim 10 wherein X comprises a -(CH₂)_m- group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a, R_b, R_c, R_d, R_e, and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.

12. An electrophotographic imaging apparatus according to claim 10 wherein the charge 20 transport material having the following formula:



where Q_1 and Q_2 are, independently, S, O, or NR₉ where R₉ is a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

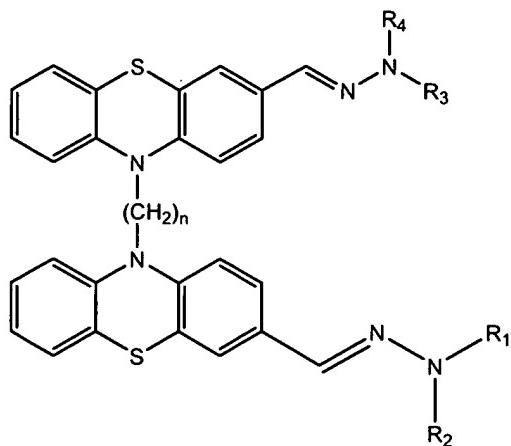
5 R₅ and R₆, each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

R₇ and R₈ are, each independently, a hydrogen, a nitro group, a cyano group, a halogen, an alkoxy group, a hydroxyl group, a thiol group, an amino group, a carboxyl group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

10 X is a linking group.

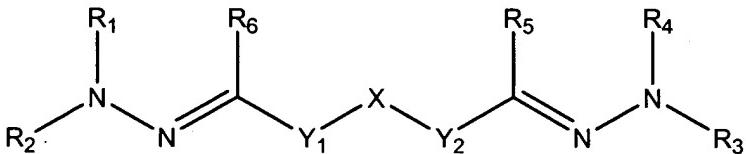
13. An electrophotographic imaging apparatus according to claim 12 wherein X comprises a -(CH₂)_m- group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a, R_b,
15 R_c, R_d, R_e, and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.

14. An electrophotographic imaging apparatus according to claim 12 wherein the charge transport material comprises the following formula:

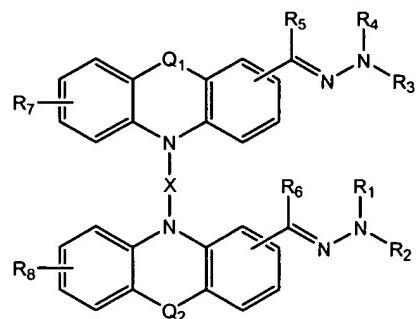


20

where n is an integer between 1 and 30 and R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.

15. An electrophotographic imaging apparatus according to claim 10 wherein the photoconductive element further comprises a second charge transport material.
16. An electrophotographic imaging apparatus according to claim 15 wherein the second charge transport material comprises an electron transport compound.
17. An electrophotographic imaging apparatus according to claim 10 further comprising a toner dispenser.
- 10 18. An electrophotographic imaging process comprising:
- (a) applying an electrical charge to a surface of an organophotoreceptor comprising an electrically conductive substrate and a photoconductive element on the electrically conductive substrate, the photoconductive element comprising
- (i) a charge transport material having the formula
- 15 
- where X is a linking group;
- Y₁ and Y₂ are, each independently, a phenothiazine group, a phenoxazine group, or a phenazine group;
- 20 R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and
- R₅ and R₆ are, each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;
- (b) imagewise exposing the surface of the organophotoreceptor to radiation to dissipate charge in selected areas and thereby form a pattern of charged and uncharged areas on the surface;
- 25 (c) contacting the surface with a toner to create a toned image; and
- (d) transferring the toned image to substrate.

19. An electrophotographic imaging process according to claim 18 wherein X comprises a $-(CH_2)_m-$ group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a, R_b,
5 R_c, R_d, R_e, and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.
20. An electrophotographic imaging process according to claim 18 wherein the charge transport material having the following formula:

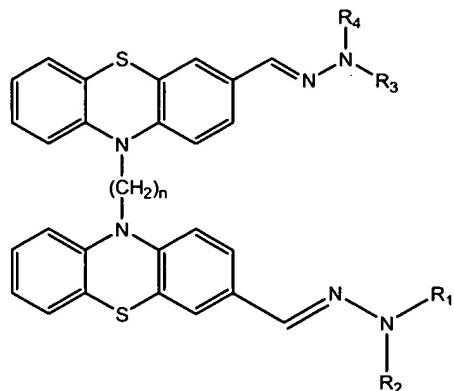


- 10 where Q₁ and Q₂ are, independently, S, O, or NR₉ where R₉ is a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;
- R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;
- 15 R₅ and R₆, each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;
- R₇ and R₈ are, each independently, a hydrogen, a nitro group, a cyano group, a halogen, an alkoxy group, a hydroxyl group, a thiol group, an amino group, a carboxyl group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and
- 20 X is a linking group.

21. An electrophotographic imaging process according to claim 20 wherein X comprises a $-(CH_2)_m-$ group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic

group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a, R_b, R_c, R_d, R_e, and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.

- 5 22. An electrophotographic imaging process according to claim 20 wherein the charge transport material comprises the following formula:

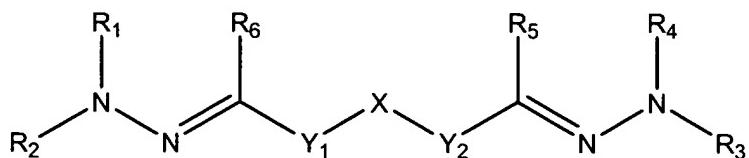


where n is an integer between 1 and 30 and R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.

- 10 23. An electrophotographic imaging process according to claim 18 wherein the photoconductive element further comprises a second charge transport material.

24. An electrophotographic imaging process according to claim 23 wherein the second charge transport material comprises an electron transport compound.

- 15 25. A charge transport material having the formula



where X is a linking group;

- 20 Y₁ and Y₂ are, each independently, a phenothiazine group, a phenoxazine group, or a phenazine group;

R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

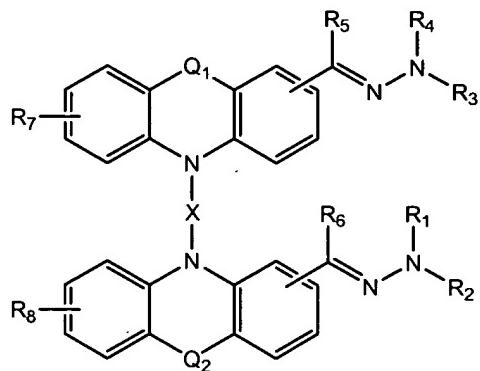
R₅ and R₆ are, each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.

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26. A charge transport material according to claim 25 wherein X comprises a -(CH₂)_m-group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a, R_b, R_c, R_d, R_e,
10 and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.

10

27. A charge transport material according to claim 25 wherein the charge transport material having the following formula:



15

where Q₁ and Q₂ are, independently, S, O, or NR₉ where R₉ is a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

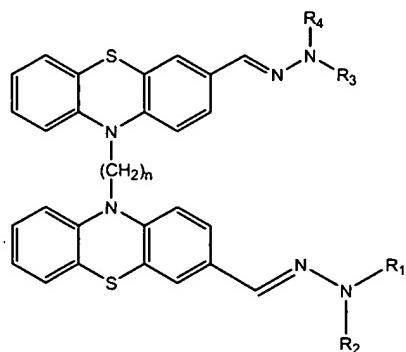
20 R₅ and R₆, each independently, a hydrogen, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

R₇ and R₈ are, each independently, a hydrogen, a nitro group, a cyano group, a halogen, an alkoxy group, a hydroxyl group, a thiol group, an amino group, a carboxyl group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

X is a linking group.

- 5 28. A charge transport material according to claim 27 wherein X comprises a -(CH₂)_m-group, where m is an integer between 1 and 30, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, Si, P, C=O, O=S=O, a heterocyclic group, an aromatic group, an NR_a group, a CR_b group, a CR_cR_d group, or a SiR_eR_f where R_a, R_b, R_c, R_d, R_e, and R_f are, each independently, a bond, H, a hydroxyl group, a thiol group, a carboxyl group, an
10 amino group, an alkyl group, an alkoxy group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring group.

29. A charge transport material according to claim 27 wherein the charge transport material comprises the following formula:



- 15 where n is an integer between 1 and 30 and R₁, R₂, R₃, and R₄ are, each independently, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.